

CLAIMS

What is claimed is:

1. A method for rendering an image described in a multi-colorant color space, in a single-colorant color space, the method comprising:

examining the image to find conflicting colors in the image;

creating a single colorant version of the image; and

5 selectively adding texture to portions of the single colorant version of the image that are associated with the conflicting colors.

2. The method for rendering an image of claim 1 wherein the step of examining further comprises:

collecting a histogram of the multicolor image pixels wherein histogram bins tally and sort pixels based on at least one characteristic; and

5 examining the histogram to find color peaks that are similar in the at least one characteristic.

3. The method for rendering an image of claim 1 wherein the step of examining further comprises:

examining the image to find colors peaks in the image that have similar lightness (L^*).

4. A method for rendering an image described in a multi-color color space, in a single-colorant color space, the method comprising:

collecting histogram information from the multi-color color space image wherein bins within the histogram classify image pixels based on luminance information and hue information;

5 classifying peaks within the histogram that have similar luminance as conflicting colors; and

applying modulation to at least one gray scale version of the conflicting colors thereby making all gray scale versions visually distinguishable from one another.

5. The method for rendering an image of claim 4 further comprising before the

step of classifying, locating peaks within the histogram data.

6. The method for rendering an image of claim 4 wherein the step of applying modulation further comprises associating a unique modulation to each of the gray scale versions.

7. The method for rendering an image of claim 4 further comprising:

measuring a color distance between at least one pixel in the image and at least one conflicting color;

5 applying an attenuated modulation to at least one pixel in the gray scale version of the image, the attenuation ranging from zero to one hundred percent of a reference modulation, the level of attenuation being a function of the measured color distance.

8. The method for rendering an image of claim 7 wherein the step of applying an attenuated modulation further comprises:

applying an attenuated modulation to at least one pixel in the gray scale version of the image, the attenuation ranging from zero to one hundred percent of a reference modulation, the level of attenuation being a non-linear function of the measured color distance.

9. The method for rendering an image of claim 7 wherein the step of applying an attenuated modulation further comprises:

applying an attenuated modulation to at least one pixel in the image, the attenuation ranging from zero to one hundred percent of a reference modulation, the level 5 of attenuation being a linear function of the measured color distance.

10. An image processor operative to generate a single colorant version of a color image, the single colorant version including modulations only where necessary to distinguish between conflicting colors, the image processor comprising:

an image analyzer operative to find and classify conflicting colors in the 5 color image; and

a gray scale modulator operative to add modulations to gray scale versions

of only the conflicting colors within a gray scale version of the color image.

11. The image processor of claim 10 wherein the image analyzer further comprises:

a histogram collector operative to classify pixels in the color image based on a characteristic that is also used to generate a single colorant version of the color image.

12. The image processor of claim 11 wherein the image analyzer further comprises:

a conflicting color detector operative to examine the histogram and find pixels that are similar with respect to the characteristic that is used to generate a single colorant version of the image.

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13. The image processor of claim 10 wherein the image gray scale modulator further comprises:

a color relationship discriminator operative to receive conflicting color classification information from the image analyzer and color image pixel information, the
5 color relationship discriminator operative to determine a relationship between the color image pixel and the conflicting color.

14. The image processor of claim 13 wherein the image gray scale modulator further comprises:

a modulation attenuator operative to attenuate a gray scale modulation based on the relationship between the color image pixel and the conflicting color.

15. The image processor of claim 13 wherein the image gray scale modulator further comprises:

a modulation generator operative to generate a gray scale modulation for application to a gray scale version of a color.

16. The image processor of claim 13 wherein the relationship between the conflicting color and the color image is a color distance within a color space.

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17. The image processor of claim 13 wherein the relationship between the conflicting color and the color image is a color distance within a perceptually uniform color space.

18. The image processor of claim 13 wherein the relationship between the conflicting color and the color image is a color distance within a CIELAB color space.

19. The image processor of claim 10 wherein the image processor further comprises an image receiver.

20. The image processor of claim 19 wherein the image receiver further comprises a xerographic printer.